

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference NA021	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/JP2005/002045	International filing date (<i>day/month/year</i>) 10.02.2005	Priority date (<i>day/month/year</i>) 13.02.2004
International Patent Classification (IPC) or national classification and IPC G01N21/27(2006.01)		
Applicant OMRON CORPORATION		

1.	This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.	
2.	This REPORT consists of a total of <u>14</u> sheets, including this cover sheet.	
3.	This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of <u>4</u> sheets, as follows: <div><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</div> b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).	
4.	This report contains indications relating to the following items: <div><input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input checked="" type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</div>	

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I

Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-9 _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. 2-8 _____ as originally filed/furnished
- nos.* 1, 9, 10 _____ as amended (together with any statement) under Article 19
- nos.* _____ received by this Authority on _____
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets Fig. 1-10 _____ as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☒ the claims, nos. 1-10 _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 9, 10

because:

☐ the said international application, or the said claims Nos. _____
relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____
are so unclear that no meaningful opinion could be formed (*specify*):

☒ the claims, or said claims Nos. 9, 10 (See Supplemental Box) are so inadequately supported
by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _____

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See Supplemental Box for further details.

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement																								
1.	Statement																								
	<table><tr><td>Novelty (N)</td><td>Claims</td><td>6, 7, 9, 10</td><td>YES</td></tr><tr><td></td><td>Claims</td><td>1-5, 8</td><td>NO</td></tr><tr><td>Inventive step (IS)</td><td>Claims</td><td>9, 10</td><td>YES</td></tr><tr><td></td><td>Claims</td><td>1-8</td><td>NO</td></tr><tr><td>Industrial applicability (IA)</td><td>Claims</td><td>1-10</td><td>YES</td></tr><tr><td></td><td>Claims</td><td></td><td>NO</td></tr></table>	Novelty (N)	Claims	6, 7, 9, 10	YES		Claims	1-5, 8	NO	Inventive step (IS)	Claims	9, 10	YES		Claims	1-8	NO	Industrial applicability (IA)	Claims	1-10	YES		Claims		NO
Novelty (N)	Claims	6, 7, 9, 10	YES																						
	Claims	1-5, 8	NO																						
Inventive step (IS)	Claims	9, 10	YES																						
	Claims	1-8	NO																						
Industrial applicability (IA)	Claims	1-10	YES																						
	Claims		NO																						
2.	Citations and explanations (Rule 70.7)																								
	Document 1: JP 2003-270132 A (Canon Inc.), 25 September 2003, entire text (Family: none)																								
	Document 2: JP 2003-121350 A (Mitsubishi Chemical Corporation), 23 April 2003, entire text (Family: none)																								
	Document 3: JP 2003-121349 A (Mitsubishi Chemical Corporation), 23 April 2003, entire text (Family: none)																								
	Document 4: JP 2002-365210 A (Hitachi, Ltd.), 18 December 2002, entire text (Family: none)																								
	Document 5: JP 2003-42947 A (Mitsubishi Chemical Corporation), 13 February 2003, entire text (Family: none)																								
	Document 6: JP 2003-57173 A (Mitsubishi Chemical Corporation), 26 February 2003, entire text (Family: none)																								
	Document 7: JP 2002-357543 A (Mitsubishi Chemical Corporation), 13 December 2002, fig. 11 and example 4 (Family: none)																								
	Document 8: JP 2002-357537 A (Mitsubishi Chemical Corporation), 13 December 2002, fig. 5, 7 and 10 (Family: none)																								
	Document 9: JP 2003-14622 A (Mitsubishi Chemical																								

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

Corporation), 15 January 2003, entire text
(Family: none)

Document 10: JP 2003-14765 A (The Institute of Physical
and Chemical Research), 15 January 2003,
entire text (Family: none)

Document 11: JP 10-160737 A (Dainippon Printing Co.,
Ltd.), 19 June 1998, entire text (Family:
none)

Document 12: JP 2001-149774 A (Japan Science and
Technology Corp.), 5 June 2001, paragraph
[0002], (Family: none)

Document 13: JP 2003-511666 A (Saromeddo Inc.), 25 March
2003, entire text & WO 01/25757 A

Claims 1 and 5/Documents 2 to 9/Lacks Novelty

Documents 2 to 9 set forth SPR sensors, wherein a metal thin-film layer made from a precious metal such as silver or gold is used, and changes are made in the thickness of the thin-film layer per se, and said thin-film layer is provided on the substrate in a dispersed manner; irregularities in the metal thin-film layer are formed by positioning metal particles on the substrate or on the metal thin-film layer, and the SPR is observed by measuring the angle of resonance. Therefore there is no particular difference between the inventions set forth in these documents and the invention set forth in claims 1 and 5 of this application.

Claims 3 and 4/Documents 2, 3, 5 to 9/Lacks Novelty

Documents 2, 3 and 5 to 9 set forth metal thin-films for SPR sensors, wherein by forming a metal thin film on irregularities formed on a substrate, both flat parts and

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citations and explanations supporting such statement

protruding parts have an uninterrupted metal thin film, and the metal thin film is constituted so as to form irregularities, and there is no particular difference between the inventions set forth in documents 2, 3 and 5 to 8 and the invention set forth in claims 3 and 4 of this application. Therefore the invention set forth in claims 3 and 4 lacks novelty.

Claim 2/Documents 4 and 10/Lacks Novelty

Documents 4 and 10 set forth SPRs, wherein the irregularities in the sensor surface are constituted using metal fine particles positioned on a substrate or on a metal thin-film layer, and there is no difference between these inventions and the invention set forth in claim 2 of this application. Therefore the invention set forth in claim 2 lacks novelty.

Claim 8/Documents 2, 3 and 8/Lacks Novelty

An SPR having a metal sensor surface with irregularities, wherein an optical system is provided in such a manner that measuring light is incident from the rear surface of the sensor, and reflected light of the sensor surface is observed from the same rear side, is a known feature, as set forth in documents 2, 3 and 8.

Claims 6 and 7/Documents 4, 10, 11 to 13/No Inventive Step

Immobilizing metal fine particles using an amino silane coupling agent is a known technique as set forth in document 11, and immobilizing metal fine particles using chemical modification is a known technique as set forth in document 12.

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

In addition, when bonding and/or immobilizing metal fine particles, carrying out a rinsing step after applying a coupling agent is a known technique, as set forth in document 10.

Claims 9 and 10

As set forth in Box III, of the matters added by the Article 19 amendments, with regard to the terms "in proximity to the surface" and "outside the proximity to the surface", there is no support for these terms or definition of these terms in the description, and it is difficult to clearly ascertain the feature concerning the invention set forth in claims 9 and 10, therefore the written opinion below is tentatively indicated.

An SPR, wherein when measuring irregularities formed on a metal thin film, the resonance frequency and angle of resonance are detected on a number of occasions, and one of the two is associated with the change in refractive index in the proximity to the surface, and the other is associated with the change in refractive index outside the proximity to the surface, is not disclosed in any of the documents cited in the international search report.

With regard to the feature which is deemed to cause the subject matter of the application to be extended beyond the content of the application as filed, and added to the amended claim 1, wherein the height and width of the protrusions in the metal thin film is set to fall within the range of 20 to 150nm, document 1 (paragraph [0036]) indicates that the height and width of the protrusions in the metal thin film is set to 20nm, and

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document 1 (paragraph [0038]) sets forth an embodiment wherein the production method of replica pressing results in the existence of a compressed metal thin film also in the recesses. There is no difference between these inventions and the invention set forth in claims 9 and 10 of this application, therefore even were the aforementioned amendment to be accepted, the invention would still lack novelty and not involve an inventive step.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

(1) With regard to the process of simultaneously measuring the change in refractive index in proximity to the surface and the change in refractive index outside the proximity to the surface additionally disclosed in the amended claim 9, there is no mention in the description of the specific simultaneous equation for determining the change in refractive index Δn_1 and Δn_2 from the change in resonance peak wavelength $\Delta \lambda_1$ and $\Delta \lambda_2$; the method for "experimentally determining" (description paragraph [0030]) said formula, or examples of actual equations determined by said method.

(2) Terms in the description corresponding to "in proximity to the surface" and "outside the proximity to the surface" added by the amendment to claim 9, and the specific scope indicated by these terms, are unclear. In addition, the terms in the description which may correspond to the aforementioned added terms are inconsistent, and a variety of terms and expressions are used intermittently, such as "solvent part", "changes only on the surface of the metal layer", "interaction of the receptors and ligands on the surface of the metal layer", "proximity to the recesses", "proximity to the protrusions", "electric field in local mode", "electric field in propagation mode", "proximity to the surface of metal fine particles", "the range of several hundred nm from the surface of the flat part", "based on the interaction of molecules on the surface of the metal layer", "solvent in proximity to the metal layer", and the relation between these terms and expressions is

Box No. VIII Certain observations on the international application

unclear.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

(Continued from Box III)

As set forth in Box VIII (1), the scope of the meaning indicated by "in proximity to the surface" and "outside the proximity to the surface" added by the amendment to claim 9, and the correspondence to related terms in the description are unclear. As a consequence, claim 9 is not fully supported by the description, and it is impossible to form a meaningful opinion. With regard to said claim, a provisional written opinion was indicated only taking into account the other matters added by the aforementioned amendment.

Supplemental Box

(Continued from Box I)

The wording "the depth and width of the recesses, or the height and width of protrusions falls within the range of 20nm to 150nm" has been added to claim 1, but there is no corresponding disclosure in the description at the time of filing.

In the description at the time of filing, paragraph [0023] indicates that when recesses in the metal layer are formed of metal fine particles, the diameter of said particles is "the diameter of metal fine particles 110 preferably falls within the range of 20 to 150nm". However, this defines the "height" and "width" of recesses made by metal fine particles, and there is no numerical delimitation of their size. In addition, the aforementioned added feature also contains numerical delimitations relating to "recesses", but in the embodiments in which metal fine particles are made to serve as protrusions, said recesses correspond to the distance between said particles, therefore there is no disclosure which numerically delimits said interval in the description.

Moreover, the invention of this application, as set forth in claim 3, also includes aspects in which the aforementioned recesses and protrusions are formed not by metal fine particles but by irregularities in the metal film per se, but with regard to such aspects, the description contains no specific numbers concerning the size of individual protrusions and recesses.

Therefore the aforementioned added amendment is acknowledged to cause the subject matter of the application to be extended beyond the content of the application as filed. Therefore with regard to the

Supplemental Box

invention set forth in claim 1 and dependent claims, according to the provisions of PCT Rule 70.2(c), the written opinion was formed on the basis that the aforementioned added amendment has not been made for said scope exceeding the original scope.